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ADAPTIVE PNEUMATIC SEAT CUSHION AND BACKREST CUSHION FOR VEHICLES AND AEROPLANES

The present invention relates to an adaptive pneumatic seat cushion and backrest cushion for vehicles and aeroplanes, according to the precharacterising part of claim 1. Pneumatic seat cushions and backrest cushions are known per se. As a rule they comprise a multitude of air tubes, arranged side by side, which can be aerated and de-aerated by way of a common valve, with the design and construction of such pneumatic seat cushions and backrest cushions being similar to that of known air mattresses. Certain adaptation options consist of having different air pressure settings in individual tubes, as a result of which the shape and softness can be varied to a limited extent. For practical application, such cushions are provided with a textile cover. However, the basic structure of the tubes remains visible and - an essential factor in a cushion - can also be felt.

It is the object of the present invention to create a seat cushion and backrest cushion that is adaptive within a wide range; meets very high requirements in relation to seating comfort; can achieve noticeable weight savings when compared to conventional foam cushions; and during whose manufacture existing seat shell constructions can easily be taken into account.

The object is met by the essential characteristics set out in claim 1, and by further advantageous characteristics set out in the other claims. The invention is explained in more detail with reference to the enclosed drawing.

The following are shown:

Fig. 1 a perspective of a first embodiment;

Fig. 2 a section AA of the first embodiment;

Fig. 3 a perspective of a second embodiment;

Fig. 4 a longitudinal section AA of the second embodiment; and

Fig. 5 a longitudinal section BB of the second embodiment.

Fig. 1 shows a perspective view of a first embodiment of a seat cushion and backrest cushion according to the invention, in this instance of a simple design, for example for a means of mass transportation. The cushion is divided into a seat cushion 1 and a backrest cushion 2. These are individual units and are for example joined by a textile connection 3. Any seat cover that may be used has been removed. Also not shown is the actual seat structure because it forms part of the state of the art and does not form part of the subject matter of the invention.

Fig. 2 shows a section AA of the seat cushion 1 and diagrammatically shows the interior structure of said seat cushion 1: it comprises a shell 4, made from a textile material which is preferably of low elasticity. Inserted into this shell 4 are a plurality of tubular textile pockets 5, which are also of low elasticity, wherein said textile pockets, along seams 6, are connected to the shell 4 on the one hand and to each other on the other hand. Each pocket 5 comprises a pouch 7 which consists of an elastic plastic material and comprises a valve 8 for aeration and de-aeration. If the pouches 7 are filled with compressed air, then - due to the tensor character of the pressure - each

pouch 7 strives to assume a circular cross sectional shape. However, the shape of the pockets 5 and their connection to the shell 4 prevents this. However, the shell 4 is tensioned as a result of this restriction. Consequently, the actual seat surface is not formed by the sum of the pockets 5, but instead by the top of the tensioned shell 4, which results in a significant change both in the feel and comfort of the seat. Since each pouch 7 can be individually filled with compressed air, different pressures can be provided for individual pouches. In this way the seating comfort can be matched to individual requirements.

In principle, the design shown in Fig. 2 is the same for the seat cushion and the backrest cushion 2. Of course individual parameters such as the number of pockets 5 and their width and height as well as the air pressure in them can be selected so as to be different.

Fig. 3 shows a second embodiment of the seat cushion 1 and backrest cushion 2 with shapes which more closely fit the anatomical form. However, as shown in Fig. 4 the basic structure of the shell 4, pockets 5 and pouches 7 remains the same. The cross dimensions of the pockets 5 and the pouches 7 are however made in such a way that the pockets 5, of which there are two for example, which pockets are situated against or on the border of the seat cushion 1, are selected so as to be larger than those which together form the seat surface.

In Figs 2 and 3 the pockets 5 in the seat cushion 1 are arranged parallel to the direction of the seat, while in the backrest cushion 2 they are arranged in the top-to-bottom direction, to which Figs 4 and 5 also refer. Of course it is also possible to arrange the pockets both in the seat cushion 1 and in the backrest cushion 2 so as to be across the directions mentioned, with the

consequence for Fig. 5 being that the contour arrangement is symmetrical.

Fig. 4, which represents a section AA of Fig. 3, shows the second embodiment.

Fig. 5 shows a longitudinal section BB of Fig. 3, for example through one of the outside pockets 5. In the present embodiment, said pocket 5 is contoured such that its height is reduced from the front towards the middle and is increased again towards the rear. Of course other designs also fall within the scope of the inventive step. One can thus generally state that the cross dimensions of the pockets 5 vary along their longitudinal dimensions. For example, individual pockets 5 can have a conical taper from the front to the rear - or vice versa - or their cross section can be constant in shape and size. As the pockets 5 are made from textile materials, such shapes are state of the art. This equally applies to the likewise form-defining shell 4. This shell 4 can for example be open at the rear of the seat cushion so that the connections between the valves 8 and the air hoses 9 can be made only once the seat cushion has been made.

The above explanations relating to the seat cushion of course equally apply to the backrest cushion 2. The dimensions of the pockets 5, their number and the air pressures to be applied can easily be adapted to the particular requirements to be met so that optimum seat comfort can be achieved. Since seat comfort depends on the body dimensions of the seated person, each pouch 7 inserted in a pocket 5 can individually be filled with compressed air. In this way the basic design, which has been anatomically optimised, can in addition be personally optimised.

The fact that form and behaviour of seat cushion 1 and backrest cushion 2 are primarily defined by the tensioned shell 4, and the pockets 5 with pouches 7 primarily serve to tension and form the shell is decisive and in accordance with the invention.

Attaching the seat cushion 1 and the backrest cushion 2 in a given seat structure or seat shell preferably takes place by two or more adherence-type closure strips which can also be attached to the shell 4 by sewing, and to the seat structure by way of adhesion. Other ways of attachment, such as for example by clamps or buttons, also fall within the scope of this invention.